

PCT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|---|--|
| Applicant's or agent's file reference 320 | FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. | |
| International application No. PCT/GB 00/ 02211 | International filing date (day/month/year) 07/06/2000 | (Earliest) Priority Date (day/month/year) 08/06/1999 |
| Applicant DNA RESEARCH INSTRUMENTS LIMITED et al. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 00/02211

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01N1/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 5 453 382 A (TSUDA TAKAO ET AL) 26 September 1995 (1995-09-26) column 6, line 36-56; figure 1 | 1,3 |
| Y | --- | 2,5-9, 11,12 |
| X | EP 0 416 326 A (HEWLETT PACKARD CO) 13 March 1991 (1991-03-13) column 2, line 26 -column 3, line 32 | 1,3 |
| X | WO 98 26872 A (ANSYS INC) 25 June 1998 (1998-06-25) abstract; claim 11; figures 1,2 | 1,4,7,10 |
| Y | --- | 2,5-9, 11,12 |
| | --- -/-- | |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

27 September 2000

Date of mailing of the international search report

09/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Brison, O

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 00/02211

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| Y | WO 99 13051 A (RUDI KNUT) 18 March 1999 (1999-03-18) abstract; claims 1-3,7-9 ---- | 5,11 |
| Y | WO 93 01494 A (TOXI LAB INC) 21 January 1993 (1993-01-21) claims 1,22,27; figure 2 ---- | 6,12 |
| X | DE 195 16 179 C (CAMMANN KARL PROF DR) 21 November 1996 (1996-11-21) column 13, line 32-40; figure 4 ---- | 1,3 |
| X | US 5 565 622 A (MURPHY GREGORY E) 15 October 1996 (1996-10-15) abstract; figure 1 ---- | 1,2 |
| X | WO 98 41855 A (PAWLISZYN JANUSZ B) 24 September 1998 (1998-09-24) abstract; claims 1,2 ---- | 1-3 |
| A | WO 94 20192 A (MINNESOTA MINING & MFG) 15 September 1994 (1994-09-15) page 6, line 28-32; figure 2 ----- | 6,12 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02211

| Patent document cited in search report | | | Publication date | Patent family member(s) | | Publication date |
|--|---------------|--|------------------|-------------------------|------------|------------------|
| US 5453382 A | | | 26-09-1995 | NONE | | |
| ✓ 1 | EP 0416326 A | | 13-03-1991 | DE | 69003527 D | 28-10-1993 |
| | | | | DE | 69003527 T | 24-02-1994 |
| | | | | DE | 69009123 D | 30-06-1994 |
| | | | | DE | 69009123 T | 01-09-1994 |
| | | | | EP | 0446970 A | 18-09-1991 |
| | | | | HK | 127995 A | 18-08-1995 |
| | | | | JP | 3106406 A | 07-05-1991 |
| | | | | | | |
| ✓ 2 | WO 9826872 A | | 25-06-1998 | AU | 5693998 A | 15-07-1998 |
| ✓ 3 | WO 9913051 A | | 18-03-1999 | NO | 974113 A | 09-03-1999 |
| | | | | AU | 9191798 A | 29-03-1999 |
| 4 ✓ | WO 9301494 A | | 21-01-1993 | AU | 2310992 A | 11-02-1993 |
| 5 | DE 19516179 C | | 21-11-1996 | WO | 9635121 A | 07-11-1996 |
| | US 5565622 A | | 15-10-1996 | DE | 19525771 A | 28-03-1996 |
| | | | | JP | 8094597 A | 12-04-1996 |
| 6 ✓ | WO 9841855 A | | 24-09-1998 | US | 6042787 A | 28-03-2000 |
| | | | | AU | 6491598 A | 12-10-1998 |
| | | | | EP | 0966678 A | 29-12-1999 |
| 7 ✓ | WO 9420192 A | | 15-09-1994 | US | 5391298 A | 21-02-1995 |
| | | | | DE | 69400820 D | 05-12-1996 |
| | | | | DE | 69400820 T | 12-06-1997 |
| | | | | EP | 0687193 A | 20-12-1995 |
| | | | | JP | 8506900 T | 23-07-1996 |

Copy for the Elected Office (EO/US)
PATENT COOPERATION TREATY

PCT/GB00/02211

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

KIDDLE, Simon, J.
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
ROYAUME-UNI

| | |
|---|---|
| Date of mailing (day/month/year) 09 July 2001 (09.07.01) | IMPORTANT NOTIFICATION |
| Applicant's or agent's file reference 320 | |
| International application No. PCT/GB00/02211 | International filing date (day/month/year) 07 June 2000 (07.06.00) |

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address

DNA RESEARCH INNOVATIONS LIMITED
940 Conforth Drive
Sittingbourne Business Centre
Kent ME9 8PX
United Kingdom

State of Nationality
GB

State of Residence
GB

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address

DNA RESEARCH INNOVATIONS LIMITED
940 Cornforth Drive
Sittingbourne Research Centre
Kent ME9 8PX
United Kingdom

State of Nationality
GB

State of Residence
GB

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☒ the International Preliminary Examining Authority ☐ other:

| | |
|---|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer R. Chrem Telephone No.: (41-22) 338.83.38 |
|---|--|

PCT

**NOTIFICATION OF THE RECORDING
 OF A CHANGE**

(PCT Rule 92bis.1 and
 Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

KIDDLE, Simon, J.
 Mewburn Ellis
 York House
 23 Kingsway
 London WC2B 6HP
 ROYAUME-UNI

Date of mailing (day/month/year)

29 June 2001 (29.06.01)

Applicant's or agent's file reference

320

IMPORTANT NOTIFICATION

International application No.

PCT/GB00/02211

International filing date (day/month/year)

07 June 2000 (07.06.00)

1. The following indications appeared on record concerning:

☒

the applicant

☐

the inventor

☐

the agent

☐

the common representative

Name and Address

DNA RESEARCH INSTRUMENTS LIMITED
 Sittingbourne Research Centre
 Building 740
 Heeley Close
 Sittingbourne
 Kent ME9 8HL
 United Kingdom

State of Nationality

GB

State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐

the person

☒

the name

☒

the address

☐

the nationality

☐

the residence

Name and Address

DNA RESEARCH INNOVATIONS LIMITED
 940 Conforth Drive
 Sittingbourne Business Centre
 Kent ME9 8PX
 United Kingdom

State of Nationality

GB

State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒

the receiving Office

☐

the designated Offices concerned

☐

the International Searching Authority

☒

the elected Offices concerned

☒

the International Preliminary Examining Authority

☐

other:

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Lazar Joseph Panakal

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

KIDDLE, Simon, J.
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
ROYAUME-UNIDate of mailing (day/month/year)
08 December 2000 (08.12.00)Applicant's or agent's file reference
320

IMPORTANT NOTIFICATION

International application No.
PCT/GB00/02211International filing date (day/month/year)
07 June 2000 (07.06.00)

1. The following indications appeared on record concerning:

☐

the applicant

☐

the inventor

☒

the agent

☐

the common representative

Name and Address

COHEN, Alan, Nicol
2 Grove Place
Tatsfield
Westerham
Kent TN16 2BB
United Kingdom

State of Nationality

State of Residence

Telephone No.

01959 577172

Facsimile No.

01959 577185

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒

the person

☒

the name

☒

the address

☐

the nationality

☐

the residence

Name and Address

KIDDLE, Simon, J.
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
United Kingdom

State of Nationality

State of Residence

Telephone No.

+44 (0)20 7240 4405

Facsimile No.

+44 (0)20 7240 9339

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒

the receiving Office

☒

the designated Offices concerned

☐

the International Searching Authority

☐

the elected Offices concerned

☐

the International Preliminary Examining Authority

☐

other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Peggy Steunenberg

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38



Published:

- With international search report.
- Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 00/02211

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N1/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 5 453 382 A (TSUDA TAKAO ET AL) 26 September 1995 (1995-09-26) column 6, line 36-56; figure 1 | 1,3 |
| Y | --- | 2,5-9, 11,12 |
| X | EP 0 416 326 A (HEWLETT PACKARD CO) 13 March 1991 (1991-03-13) column 2, line 26 -column 3, line 32 | 1,3 |
| X | WO 98 26872 A (ANSYS INC) 25 June 1998 (1998-06-25) abstract; claim 11; figures 1,2 | 1,4,7,10 |
| Y | --- | 2,5-9, 11,12 |
| | --- -/-- | |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

27 September 2000

Date of mailing of the international search report

09/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Brison, 0

INTERNATIONAL SEARCH REPORT

Inter Application No

PCT/GB 00/02211

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| Y | WO 99 13051 A (RUDI KNUT) 18 March 1999 (1999-03-18) abstract; claims 1-3,7-9 --- | 5,11 |
| Y | WO 93 01494 A (TOXI LAB INC) 21 January 1993 (1993-01-21) claims 1,22,27; figure 2 --- | 6,12 |
| X | DE 195 16 179 C (CAMMANN KARL PROF DR) 21 November 1996 (1996-11-21) column 13, line 32-40; figure 4 --- | 1,3 |
| X | US 5 565 622 A (MURPHY GREGORY E) 15 October 1996 (1996-10-15) abstract; figure 1 --- | 1,2 |
| X | WO 98 41855 A (PAWLISZYN JANUSZ B) 24 September 1998 (1998-09-24) abstract; claims 1,2 --- | 1-3 |
| A | WO 94 20192 A (MINNESOTA MINING & MFG) 15 September 1994 (1994-09-15) page 6, line 28-32; figure 2 ----- | 6,12 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02211

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|---|---------------------|----------------------------|---------------------|
| US 5453382 | A | 26-09-1995 | NONE | |
| EP 0416326 | A | 13-03-1991 | DE 69003527 D | 28-10-1993 |
| | | | DE 69003527 T | 24-02-1994 |
| | | | DE 69009123 D | 30-06-1994 |
| | | | DE 69009123 T | 01-09-1994 |
| | | | EP 0446970 A | 18-09-1991 |
| | | | HK 127995 A | 18-08-1995 |
| | | | JP 3106406 A | 07-05-1991 |
| WO 9826872 | A | 25-06-1998 | AU 5693998 A | 15-07-1998 |
| WO 9913051 | A | 18-03-1999 | NO 974113 A | 09-03-1999 |
| | | | AU 9191798 A | 29-03-1999 |
| WO 9301494 | A | 21-01-1993 | AU 2310992 A | 11-02-1993 |
| DE 19516179 | C | 21-11-1996 | WO 9635121 A | 07-11-1996 |
| US 5565622 | A | 15-10-1996 | DE 19525771 A | 28-03-1996 |
| | | | JP 8094597 A | 12-04-1996 |
| WO 9841855 | A | 24-09-1998 | US 6042787 A | 28-03-2000 |
| | | | AU 6491598 A | 12-10-1998 |
| | | | EP 0966678 A | 29-12-1999 |
| WO 9420192 | A | 15-09-1994 | US 5391298 A | 21-02-1995 |
| | | | DE 69400820 D | 05-12-1996 |
| | | | DE 69400820 T | 12-06-1997 |
| | | | EP 0687193 A | 20-12-1995 |
| | | | JP 8506900 T | 23-07-1996 |

PCT

**NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES**

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

COHEN, Alan, Nicol
2 Grove Place
Tatsfield
Westerham
Kent TN16 2BB
ROYAUME-UNI

| | | |
|---|---|---|
| Date of mailing (day/month/year) 14 December 2000 (14.12.00) | | |
| Applicant's or agent's file reference 320 | | IMPORTANT NOTICE |
| International application No. PCT/GB00/02211 | International filing date (day/month/year) 07 June 2000 (07.06.00) | Priority date (day/month/year) 08 June 1999 (08.06.99) |
| Applicant DNA RESEARCH INSTRUMENTS LIMITED et al | | |

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AU, KP, KR, US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:
AE, AL, AM, AP, AT, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EA, EE, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, OA, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW
The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 14 December 2000 (14.12.00) under No. WO 00/75623

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

| | |
|---|--|
| <p style="text-align: center;">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. (41-22) 740.14.35</p> | <p>Authorized officer J. Zahra</p> <p>Telephone No. (41-22) 338.83.38</p> |
|---|--|

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|--|---|--|
| Applicant's or agent's file reference SJK/BP5903612 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/GB00/02211 | International filing date (day/month/year) 07/06/2000 | Priority date (day/month/year) 08/06/1999 |
| International Patent Classification (IPC) or national classification and IPC G01N1/34 | | |
| Applicant DNA RESEARCH INNOVATIONS LIMITED et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 10 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

| | |
|---|--|
| Date of submission of the demand 05/01/2001 | Date of completion of this report 21.08.2001 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer Loades, M Telephone No. +49 89 2399 2184  |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02211

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-16 as originally filed

Claims, No.:

1-31 as received on 26/06/2001 with letter of 26/06/2001

Drawings, sheets:

1/2,2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
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☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 7,25,30.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 7,25,30.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Yes: Claims 8,17,18,20-24

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| | | | |
|-------------------------------|------|--------|----------------------|
| | No: | Claims | 1-6,9-16,19,26-29,31 |
| Inventive step (IS) | Yes: | Claims | |
| | No: | Claims | 1-6,8-24,26-29,31 |
| Industrial applicability (IA) | Yes: | Claims | 1-31 |
| | No: | Claims | |

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item I

Basis of the report

Claim 1:

This stems from originally filed claim 7, but differs in that it refers to an apparatus feature "reversible suction means " and a step of "reversibly drawing the liquid mixture over the solid phase".

It is not clear that this is the same scope as the steps recited in original claim 7.

Claims 26, 31:

These also differ somewhat from original claim 1 from which they stem. Again the difference seems to extend subject matter.

Claim 25:

It is not clear that subject matter of the scope recited in claim 25 was disclosed in the application as originally filed in such a broad scope, so that an extension is present here also. It is not clear that such subject matter as claimed now - using an electrode - was included in the original wording of e.g. independent claim 7. Also there was no dependent claim which would hint at this electrode as being intended to be included in the scope of original claim 7.

Claims 3-24:

These claims are generally dependent on any previous claim. This introduces combinations of subject matter which were not disclosed in the original application. The applicant has referred to individual passages in the description to support particular claims, but these are isolated from one another and cannot necessarily be combined. These claims should have been drafted taking care that particular combinations were clearly disclosed in combination in the same passage or example in the description. A comprehensive check has not been made in view of the complexity of the various possible combinations. Also in the following cases, even the individual feature is not clearly supported:

Claim 2: support not absolutely clear.

Claim 7: not clearly supported by example 1.

Claim 10,13,15: not clearly supported.

Claim 28,30: likewise not clearly supported.

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

Following on from the extension reported in Item I above, it is not clear that original claim 7 would have been interpreted to include the subject matter now claimed, with an electrode, so that it is not clear that the subject matter in present claim 25 was searched. It is also not clear that subject matter as in present claims 7 and 30 was searched.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The following documents are referred to in this report:

- D1: US-A-5 453 382 (TSUDA TAKAO ET AL) 26 September 1995 (1995-09-26)
- D2: EP-A-0 416 326 (HEWLETT PACKARD CO) 13 March 1991 (1991-03-13)
- D3: WO 98 26872 A (ANSYS INC) 25 June 1998 (1998-06-25)
- D4: WO 99 13051 A (RUDI KNUT) 18 March 1999 (1999-03-18)
- D5: WO 93 01494 A (TOXI LAB INC) 21 January 1993 (1993-01-21)
- D6: DE 195 16 179 C (CAMMANN KARL PROF DR) 21 November 1996 (1996-11-21)
- D7: US-A-5 565 622 (MURPHY GREGORY E) 15 October 1996 (1996-10-15)
- D8: WO 98 41855 A (PAWLISZYN JANUSZ B) 24 September 1998 (1998-09-24)
- D9: WO 94 20192 A (MINNESOTA MINING & MFG) 15 September 1994 (1994-09-15)

2. Review of the prior art documents:

D1 discloses an arrangement of a syringe 15 connected to an extraction tube 11 containing a packing of adsorbent material. In operation, a diluted sample serum containing an analyte to be adsorbed in the packing material 12, is inserted into the barrel of the syringe. The plunger 17 is pushed to force the sample through the packing to discharge end 31 and waste 27. This discharge end can be immersed in a solvent buffer solution and the plunger withdrawn to suck solvent through the packing and

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remove the analyte (see fig. 1 and col. 6, line 36 to col.7, line 23). Various adsorption media are proposed: see col. 3, line 51, onwards, including e.g. silicas, etc. and may be in the form of beads, etc. (see col. 3, lines 7-8). Nucleic acid extraction does not seem to be mentioned.

D2 describes a system in which a glass column 10,12 packed with a solid sorbent 14, is connected to a reversible pump arrangement 56. In most operations, reagent, wash solution, etc. is pumped from source 58, through coil 54 and valve 52 into the column 10 through its base. In a reverse pumping mode, described col. 3, lines 26-31 and col. 4, lines 38- 42, sample is drawn up from a sample vial, the column 10 being switched out of the line by the valve 52. Examples of sorbent materials are mentioned in col. 4, lines 11-21, and col. 6, lines 13-22, and include silica. There is no mention of extracting nucleic acid.

D3 discloses the use of pipettes filled with a solid phase extraction medium, e.g. C18 containing silica particles. As described in example 1, page 8, line 17 onwards, particularly line 26 onwards, liquid from a compartment is drawn up into the pipette through the disc 20 of extraction medium, and then pressure reversed to push the liquid back down through the disc. In example 2, the passage bridging pages 9-10 describes the same procedure. The system comprises an array of pipettes for operating on an array of samples.

D4 discloses a device for purifying organic material. The solid phase may be in bead form. The main embodiment is described on pages 2-3, and is for purifying DNA in bacteria, the DNA being bound to the solid phase (page 3, line 18). There is no specific disclosure of reversible suction means.

D5 discloses a solid phase extraction device, in which, in fig. 6, an extraction disc 30 is spaced from a filter member 135. In fig.3, two discs 30 are adjacent one another, with a filter 95 on top. Materials are discussed on pages 15-18 and include e.g. silica embedded in glass. The construction "will depend on the analyte being tested " (page 15, line 35. Also pages 1-2 discuss conventional loose packing materials. There seems to be no disclosure of reversible suction means or nucleic acid extraction.

D6 describes with regard to the fig. 4 apparatus (col. 13, lines 32-44, and claim 21),

how a syringe is operated in two directions to suck in and then expel liquid. During the aspiration action, DNA will bind to the solid phase in the cartridge of the syringe. Examples of solid phase materials are given in col. 7, lines 1-8.

D7 describes a syringe, the inner surface of which is coated with solid phase, and the method of sucking in and expelling a sample to obtain more intensive adsorption of the analyte. The solid phase material does not seem to be specified, nor nucleic acid extraction.

D8 describes a syringe with a fibre member therewithin, coated with an extraction material. A heater is used to provide a suction effect.

D9 describes a solid phase extraction device employing disc members.

3. Novelty and inventive step:

(The claims are not clear in scope; the following opinion is on the basis of the claims in so far as they can be understood).

Independent apparatus claim 26:

- a. This merely defines a means (container with solid phase and reversible suction means) by which the operations referred to may be performed. The arrangement of D1 would be able to perform these operations, and the adsorption medium e.g. silica, would appear to be capable of adsorbing nucleic acid, and so this document seems to represent a novelty anticipation.
- b. It would appear that the reversible pump of D2 could be operated to push liquids in either direction through column 10. Furthermore, materials which seem to be suitable for nucleic acid extraction are mentioned, so that D2 also could also represent an anticipation.
- c. D3 also seems to anticipate claim 26.
- d. In the method of D4, bacteria whose DNA is of interest, attach to solid phase particles in the form of magnetic beads. These are rinsed to bind the DNA to the solid phase (see page 3, lines 17-18). This reads onto a "solid phase capable of binding nucleic acid" in claim 26. Mixing in this step is by moving the container up and down (lines 19-20). However, in another embodiment, it is also envisaged to use a pump, which, to perform the required mixing, would be reversible.

It would appear that the skilled person knowing of the devices of e.g. D1, D2, D3, D7 and wishing to extract nucleic acids, would also be familiar with the possibility of binding DNA to solid phase as known from D4, and would apply the principle of a reversible suction arrangement to such extraction, without inventive step.

e. D6 clearly anticipates claim 26.

Independent method claim 1:

For similar reasons to the above, claim 1 is not novel in the light of D1, D2, D3, D6, and obvious from a combination of D4 with other documents.

Independent apparatus claim 31:

This is merely a system comprising a plurality of the devices of claim 26. An array of pipettes for solid phase extraction by reversible pumps is known from D3, in which the solid phase material seems to be capable for binding nucleic acid. Thus it is not novel. Claim 31 is obvious in the light of D6 in combination with D3.

Dependent claims:

The dependent claims seem to relate to mere design modifications, consequential features of the basic system of claims 1 and 26, or conventional features, and thus do not add anything inventive to these claims.

Re Item VII

Certain defects in the international application

To comply with the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2, D3, D4, D5, D6, D7, D8, D9 should have been mentioned in the description.

Re Item VIII

Certain observations on the international application

1. The expression "a solid phase capable of binding nucleic acid" is indeterminate in scope. It would appear that the skilled person would have to perform undue experimentation to determine which materials fall under this definition. The phrase is speculative. This seems to result from the fact that it is by nature attempting to define

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by function or result to be achieved rather than by concrete technical characteristics, e.g. a list of possible substances (which have actually been validated by the applicant). This leads to great difficulty in comparing this claim with the prior art documents.

It should also be noted that the application itself envisages "almost any starting material", and "allows the use of existing solid phase extraction methods" (page 2, lines 13-14 and 18-19), thus implying that the range of solid phase materials to be used in the claimed device is very broad, and includes conventional substances.

2. It is noted that the use of the words "method for extracting...", in claim 1, does not limit the claim to extracting nucleic acid, but only refers to a method suitable for this purpose. "Method of" should have been used.

The limitation is even less effective in apparatus claims 26 and 31, where "device for..." is used. Also the suction means need only be suitable for reverse operation; there is no restriction to actually performing the step of reverse pumping.

3. In the dependent claims certain points are not clear:

- claim 24 repeats previous claims
- claim 27 refers to the syringe, which has no antecedent in previous claims.

4. Revision of the statements of invention in the description has not been performed.

5. Examples 7,8 and 9 do not appear to fall within the scope of the amended claims.

Claims

1. Equipment for extracting a material from a liquid mixture containing the material which equipment comprises a container containing a solid phase able to adsorb the material to be extracted and a reversible suction means adapted to apply suction to the solid phase to draw up the liquid mixture over the solid phase and which is able to be reversed so as to pass the liquid back over the solid phase.
5
2. Equipment as claimed in claim 1 which comprises a syringe and in which the solid phase is contained within the syringe below the piston so that when the nozzle of the syringe is placed in the liquid mixture and the piston is withdrawn liquid is drawn up over the solid phase and when the piston is depressed the liquid is passed back over the solid phase.
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3. Equipment as claimed in claim 1 in which the container containing the solid phase is a cartridge attached to the nozzle of a syringe.
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4. Equipment as claimed in claim 1 in which the reversible means comprises a pipette and there is provided a plug of the solid phase contained within the pipette.
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5. Equipment as claimed in any one of claims 1 to 4 in which the solid phase comprises beads adapted to adsorb the material to be extracted.
6. Equipment as claimed in any one of claims 1 to 4 in which the solid phase comprises a plurality of spaced apart discs.
25
7. A method for extracting a material from a liquid mixture which method comprises applying suction so as to draw the liquid over a solid phase able to adsorb the material to be extracted and then reversing the suction to pass the liquid back over the solid phase.
30

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8. A method as claimed in claim 7 in which the solid phase is contained within a syringe below the piston and the nozzle of the syringe is placed within the liquid and the piston withdrawn to draw the liquid over the solid phase and then the piston is depressed to pass the liquid back over the solid phase.

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9. A method as claimed in claim 7 in which the nozzle of the syringe is placed in the liquid mixture and the piston is withdrawn and liquid is drawn up over the solid phase and the piston is then depressed and the liquid is passed back over the solid phase.

10

10. A method as claimed in claim 7 in which the reversible means comprises a pipette and there is provided a plug of the solid phase contained within the pipette.

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11. A method as claimed in any one of claims 7 to 10 in which the solid phase comprises beads adapted to adsorb the material to be extracted.

12. A method as claimed in any one of claims 7 to 10 in which the solid phase comprises a plurality of spaced apart discs.

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PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
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| | |
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| International filing date (day/month/year) 07 June 2000 (07.06.00) | Priority date (day/month/year) 08 June 1999 (08.06.99) |
| Applicant BAKER, Matthew, John | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 05 January 2001 (05.01.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

| | |
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| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer Olivia TEFY Telephone No.: (41-22) 338.83.38 |
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